REMARKS

In the Office Action, claims 1-7 were rejected under 35 USC §112, second paragraph. Claims 1-4, 6 and 7 were rejected under 35 USC §102(b) as being anticipated by Larmie. Claim 5 was rejected under 35 USC §103(a) as being unpatentable over Larmie and further in view of Tamura Akira.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version With Markings To Show Changes Made".

By the present invention ceramic pads are suspended in a sand mold, the mold having the intended appropriate configuration for the item to be produced (an ejector for a crusher, a crusher rotor or a beater hammer) with the wear surface being the one where the ceramic pads are positioned. Metal (pig iron) is then cast as usual into the mold. The upper level of the cast metal may flush with the upper level of the pads or may be slightly cover the pads.

The Examiner relies primarily on the Larmie patent in the rejections of the claims. The Examiner refers to col. 7, lines 40-50 as mentioning "the pad being impregnated with a liquid metal during the casting." Actually, the text of the Larmie patent states at lines 45-48, "an impregnating solution of a metal oxide modifier provided in the form of a precursor comprising one or more salts of a metal (e.g. a metal nitrate or acetate salt)."

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Claim 1 can only be understood as meaning a cast product (working part) consisting of a (continuous) metal matrix including inserts which are ceramic pads which have been impregnated by the liquid metal during casting of the cast product. Thus, the metal will form, as usual, the cast product and the pads will include the same metal impregnated as such in the pads. In other words, due to the impregnation or infiltration, the metal matrix is not only continuous but also is included in the pads and is solid with these pads.

As the application mentions on page 5, lines 4-17, the invention is based on the observation that the ceramic pad must be a homogenous solid solution of Al_2O_3/ZrO_2.

The specification on page 3, lines 1-33 mentions the difficulties encountered for elements having sections of 25 mm or above. Referring then to page 5, line 18 through page 6, line 16 the necessity of a choice of composition for the pads is explained.

Further to what has been described with respect to Larmie, the purpose of the Larmie patent is to produce abrasive grains which may be used with a binder as a coating on a wheel or a disc for instance to abrade due to their cutting action (col. 1, lines 13-31, col. 11, lines 62-63 and col. 12, line 64). See also col. 11, lines 46-56.

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Larmie is in fact related to new abrasive grains, which are prepared as described in claim 1 and in col. 11, lines 35-45 by a so-called sol-gel process.

The grains may be formed with, or later modified with i.e. an impregnation process, by means of salts of a metal.

Obviously, the products of the present invention are quite distinct from the teachings of Larmie.

The reference Tamura Akira was cited by the IPEA (EPO) not as being EPO 62286661, but rather as JP 62286661 A1. The complete Japanese publication and an English language translation are attached.

The technique described is as follows on page 1, left column.

2. Claim

> In order to provide hard particles on the surface of a base metal, the following steps are performed:
>
> The hard particles are fixed uniformly and continuously on the bottom of a mold made of ceramic material. A ceramic filter (grid) covers the layer of hard particles in order to prevent the motion of the particles.
>
> The mold in then heated in order to preheat the ceramic filter and the hard particles and

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is then placed on an air permeable surface. The metal is then cast under aspiration in order to coat the hard particles as well as the ceramic filter.

The "impregnation" or "infiltration" of the metal into the ceramic is never mentioned. The specification also only mentions "coating" and more precisely on page 3 of the translation, lines 26 and 27 mention:

> A metallic component with a composite layer enclosing high hard particles is thus obtained.

Although the abstract (see: CONSTITUTION) mentions "alumina, high strength zirconia, etc." the text of the Japanese Publication never refers to a Al_2O_3/ZrO_2 solid solution.

In Fig. 1, the following reference numerals are used:

10: supporting material

12: mold

14: hard particles (grains)

20: filter

22: molten metal

Thus, the product which is obtained will comprise a matrix of metal, the matrix binding hard particles which are in a flat packing position due to the mode of production. Solid solutions are not mentioned.

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U.S. Patent No. 4,997,461 to Markhoff-Matheny is related to the production of aluminous abrasive "bodies" which are modified before firing by silica-generating material by the sol-gel sintering method (title and col. 1, lines 1-22). This reference describes (col. 5, line 25) the use of specific silicon containing compounds.

No mention is made of a "pad" and the silicon containing compounds are not used as an adhesive but obviously are the "silica-generating material" necessary to enhance the grinding performance (see col. 1, lines 12-21 and col. 3, lines 27-48 of this reference).

Note however that in the specification for the present invention (page 5, line 2), it is mentioned that silicate acts like an adhesive.

The Wahl reference is not substantially different from Tamura Akira (JP 62286661) as far as the process is concerned except that there is no aspiration but a classical casting.

On the bottom of the mold made of two parts (1, 2) hard metal bodies (16) are placed. The bodies (16) e.g. are grains of sintered hard metal which are described as having a massive structure thus not being in powder form. The bodies (16) are glued, soldered or simply maintained by a pressure on supporting bars 10, 11, 12, 13 and maintained by nails 14, 15 (page 2, lines 13-21).

Thus, ceramic grains are not mentioned and the hard metal bodies (16) are not described as being impregnated (neither are they supposed to be porous).

Also attached is the executed Declaration of the inventor. (An email copy of the Declaration is also supplied to clearly illustrate the included pictures.) The inventor explains the differences between the prior art and the present invention and the advantages of the present invention.

Based on the foregoing amendments and remarks, it is respectfully submitted that the claims in the present application, as they now stand, patentably distinguish over the references cited and applied by the Examiner and are, therefore, in condition for allowance. A Notice of Allowance is in order, and such favorable action and reconsideration are respectfully requested.

However, if after reviewing the above amendments and remarks, the Examiner has any questions or comments, he is cordially invited to contact the undersigned attorneys.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please amend the specification as follows:

Please replace the paragraph beginning at page 7, line 33 with the following rewritten paragraph.

-- ~~Figure 2 describes~~ Figures 2A and 2B describe a composite wear component according to a second embodiment of the present invention with Figure 2B being a sectional view taken along line 2B-2B of Figure 2A.--

IN THE CLAIMS:

Please amend claims 1-11 as follows:

1. (Amended) Composite wear component produced by classical or centrifugal casting and consisting of

a metal matrix ~~whose~~ having a working face or faces ~~include~~ including inserts which have ~~a very high~~ wear resistance, ~~characterized in that~~ the inserts consist of a porous ceramic pad, ~~this~~ the porous ceramic pad consisting of a homogeneous solid solution of 20 to 80% of Al_2O_3 and 80 to 20% of ZrO_2, the percentages being expressed by weights of the constituents, and the porous ceramic pad ~~then~~ being ~~impregnated with~~ integrated into the metal matrix by impregnation of a liquid metal in the porous ceramic pad during the casting.

2. (Amended) Composite wear component according to Claim 1, ~~characterized in that~~ wherein the ceramic material includes from 55 to 60% by weight of Al_2O_3 and from 38 to 42% by weight of ZrO_2.

3. (Amended) Composite wear component according to Claim 1, ~~characterized in that~~ wherein the ceramic material includes from 70 to 77% by weight of Al_2O_3 and from 23 to 27% by weight of ZrO_2.

4. (Twice Amended) Composite wear component according to claim 1, ~~characterized in that~~ wherein the content of ceramic materials in the insert is between 35 and 80% by weight~~, preferably between 40 and 60% and advantageously of the order of 50%~~.

5. (Twice Amended) Composite wear component according to claim 1, ~~characterized in that~~ wherein the inserts consist of an aggregate of composite ceramic grains which have a particle size within the range F6 to F22 according to the FEPA standard.

6. (Twice Amended) Composite wear component according to claim 1, ~~characterized in that~~ wherein the ceramic grains are manufactured by one of electrofusion, ~~by~~ sintering~~, by~~ and flame spraying ~~or any other process~~.

7. (Twice Amended) Composite wear component according to claim 1, ~~characterized in that~~ wherein the ceramic grains are

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joined integrally with the aid of an inorganic or organic liquid adhesive prior to the casting with the liquid metal with a view to the production of the ceramic pad.

8. (Amended) Composite wear component according to Claim 7, ~~characterized in that~~ wherein the pad does not contain more than 4% of adhesive.

9. (Amended) Composite wear component produced by casting and composed of a metal matrix including at least one ceramic pad, ~~characterized in that~~ and at least two ceramic pads are placed side by side, leaving a gap of the order of 10 mm in order to permit the arrival of the liquid metal.

10. (Twice Amended) Composite wear component produced by classical or centrifugal casting according to claim 1 and made up of a metal matrix including a wear-resistant ceramic pad, ~~characterized in that~~ the ceramic pad is in the form of a honeycomb structure in which the various cells are of polygonal or circular shape within the ceramic phase.

11. (Amended) Composite wear component according to Claim 10, ~~characterized in that the~~ wherein a thickness of ~~the~~ walls of the various cells constituting the ceramic phase varies from 5 to 25 mm.